Open to Change

Oligonucleotide Array-Based CGH
on the Agilent DNA Microarray Platform

Agilent Technologies

Where Are You Taking Your Chromosome Analysis?

Microarrays are revolutionizing comparative genomic hybridization (CGH). Are you ready to take advantage of new research opportunities? Do you have the tools you need to dive deeper into the genome?

Scientists studying genetics have long investigated global changes in chromosomal balance.

Traditional comparative genomic hybridization (CGH) and other microscopy methods provide opportunities for rough chromosome investigation, but are fraught with challenges that hinder precise analysis. Shortcomings in spatial resolution, low-throughput methods, and weak analytical tools pose major challenges to researchers. The use of BAC and cDNA microarrays for CGH research improves resolution and throughput, but these microarrays are still compromised by nonspecific hybridization potential, inconsistent quality, limited commercial availability, and suboptimal resolution. Now, oligonucleotide microarrays can enable you to detect large or focal amplifications and deletions, elucidate copy number boundaries within the genome, and characterize chromosomal variations [1,2].

To take advantage of the promise of microarrays for CGH,

you need a platform that gives you the resolution you need to pinpoint chromosomal changes with confidence. You need a microarray platform that provides the CGH-specific probe coverage you need for genome-wide scanning, while providing the flexibility to zoom in to regions of interest. You need a platform that's optimized for CGH, yet capable of integrating with other genomics applications.

To fully explore the options offered by oligo aCGH technology, you need a platform that can go wherever your research takes you.

References

1. Barrett MT, Scheffer A, Ben-Dor A, Sampas N, Lipson D, Kincaid R, Tsang P, Curry B, Baird K, Meltzer PS, Yakhini Z, Bruhn L, Laderman S. Comparative genomic hybridization using oligonucleotide microarrays and total genomic DNA. *Proc Natl Acad Sci U S A.* 2004 Dec 21;101(51):17765-70.

2. Brennan C, Zhang Y, Leo C, Feng B, Cauwels C, Aguirre AJ, Kim M, Protopopov A, Chin L. High-resolution global profiling of genomic alterations with long oligonucleotide microarray. *Cancer Res.* 2004 Jul 15;64(14):4744-8.

DO YOU NEED TOOLS THAT GO WHERE YOUR RESEARCH TAKES YOU? TO KEEP UP WITH YOU, INSTEAD OF DEFINING YOU ARE TRYING TO TACKLE? DO YOU NEED AN OPEN PLATFORM TO HELP YOU TO ELUCIDATE THE IMPACT OF

Open Up to High Resolution Copy Number Detection

The Agilent Oligo aCGH microarray combines flexibility and sensitivity in an array designed specifically for CGH, letting you study aberrations and copy number variations with total confidence.

Engineered for flexibility. Agilent's SurePrint inkjet technology prints oligonucleotides on demand, enabling total control over array content with no compromise in cost, data quality, or scalability. The power of oligo aCGH stems from enhanced design flexibility and high-definition capabilities combined with full-genome representation by aCGH-specific, optimized probes. You now have the capability to scan genome-wide, then focus on regions of interest for high-definition analysis. Design your own arrays with eArray, our web-based portal for custom design, and receive your unique arrays in weeks rather than months.

Focused on sensitivity. Agilent's microarrays provide superior sensitivity over traditional and other array-based methods, enabling a clear path from data to decisions. Our 60-mer oligonucleotide probes are synthesized *in situ*, resulting in highly reproducible features. This enables you to work with complex mixtures, analyze heterogeneous samples, and detect biological changes that cannot be seen with other techniques.

Designed for integration. From sample preparation to data analysis, Agilent provides an integrated experimental workflow for aCGH-specific applications. Furthermore, Agilent's CGH Analytics software integrates with our GeneSpring Software Platform, enabling analysis, comparison, and visualization of data across multiple applications, improving your confidence when making close aberration calls.

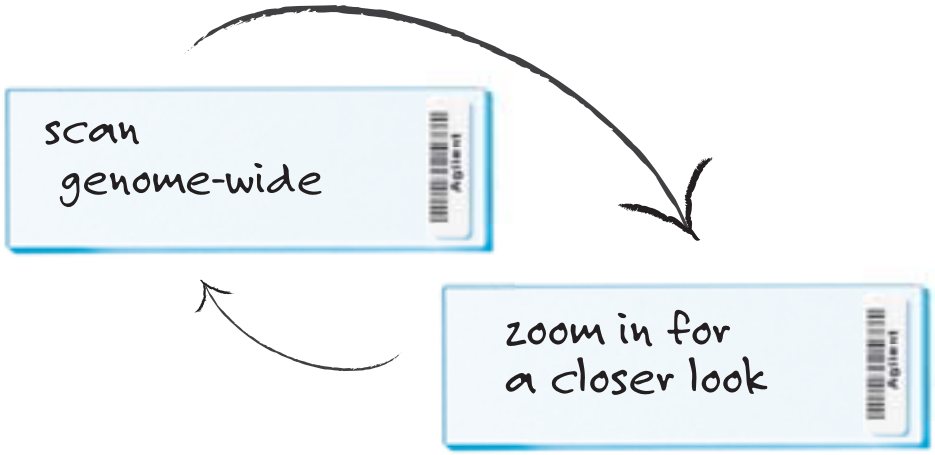
Introducing Agilent's Oligo aCGH Microarray: Optimized. Integrated. Open.

G YOUR PATH? IS ANALYSIS OF HETEROGENEOUS SAMPLES FROM DEVELOPING CANCER REGIONS AN OBSTACLE
F CHANGES WE DO NOT YET UNDERSTAND? DO YOU NEED THE ABILITY TO SCAN WIDE AND THEN ZOOM IN TIGHT?

Discover the Comprehensive Platform with Optimized CGH Tools

Identify copy number changes. Characterize molecular aberrations. Map genomic breakpoints.

Designed for discriminating resolution, the Agilent DNA Microarray Platform provides a comprehensive workflow, with products and related technical support to take you through every step of analysis. From whole-genome to high-definition (HD) targeted oligo aCGH microarrays, Agilent's platform provides the sensitivity to allow you to identify regions of interest and the flexibility to look in closer for validation and more in-depth investigation.



Choose from a Wide Range of Flexible Microarrays

Optimize your experiments with efficient custom manufacturing. Design your own CGH-specific arrays. Multiplex for maximum efficiency and reduced cost-per-experiment.

The Agilent platform offers global coverage of native DNA with CGH-specific probes to identify regions of interest, as well as the resources to design targeted arrays upon discovery of anomolous regions. Agilent's SurePrint inkjet technology ensures high-precision feature placement through base-by-base synthesis and a robust QC process, resulting in superior quality microarrays.

Catalog

- Predesigned, high-resolution microarrays enable genome-wide survey and chromosomal profiling. Oligo aCGH probes are selected based on proprietary CGH-optimized algorithms, delivering increased data quality and reproducible aberration detection.

Custom

- High-definition (HD-CGH) microarrays offer the highest resolution tiling based on Agilent's database of over 8 million CGH probes. This design process is coupled with world-class technical support, offering insights into design options and processing.

Multiplexed Arrays

- Multiple arrays on a single slide reduce costs and can reduce experimental variability. Obtain high-quality microarrays in your choice of 1, 2x, 4x, or 8x formats for maximum efficiency.

eArray

- Our online array design tool puts you in control of your array designs. SurePrint inkjet technology ensures rapid iteration, allowing you to print and receive arrays in weeks, anywhere in the world.

ARE YOU TRYING TO IDENTIFY SINGLE COPY GAINS AND LOSSES? DO YOU WANT TO DEVELOP NEW MARKER
DO YOU REQUIRE A MORE GLOBAL PERSPECTIVE THAN FISH CAN PROVIDE? DO YOU NEED A MICROARRAY THAT

Consider the Workflow that's Open to Your Needs

Adopt an end-to-end CGH solution. Integrate the CGH-specific components you need. Optimize your workflow for CGH analysis.

To take full advantage of opportunities for CGH research, your genomics workflow must be flexible enough to allow you to experiment on your own terms, while providing broadly-compatible, comprehensive tools. From sample preparation to data analysis, identify chromosomal gains and losses while controlling your own experimental direction.

SAMPLE PREPARATION

Analyze total genomic DNA with no complexity reduction using two-color hybridization (Cyanine 3 and Cyanine 5) and normal reference DNA, eliminating experimental bias. Agilent's Oligo aCGH arrays are compatible with tissues (fresh or frozen), cell lines, whole blood, and other challenging samples.

PROCESSING AND SCANNING

Take advantage of our integrated hybridization tools and award-winning scanning technology for seamless workflow integration. Built upon dependable engineering and years of experience in the industry, Agilent's DNA microarray scanner is a powerful research tool.

ADVANCED DATA ANALYSIS

Use software specifically designed for genomic aberration analysis to gain a more complete perspective of the entire chromosome, delineate aberration boundaries, and make statistically relevant variation calls. Analyze CGH and Gene Expression data jointly, validating the relationship between transcriptional and genetic regulation.

Quality Control
Labeling Kits

Hybridization
Array Processing
Scanning

Analysis & Statistics
Visualization
Pathway Integration

S FOR DIAGNOSTICS? ARE YOU SEEKING A BETTER ALTERNATIVE TO KARYOTYPING FOR IDENTIFICATION OF SMA
CAN DETECT DIMINUTIVE MICRO-DELETIONS? ARE YOU SEEKING ANSWERS TO MICRO-DELETION AND MICRO-DUPL

Detect and Analyze Even the Smallest Chromosomal Alterations

Quantify chromosomal gains and losses. Dive deeper into your regions of interest. Experience unmatched data clarity.

Agilent's Oligo aCGH tools offer increased sensitivity and reduced noise for more accurate analysis of genetic gains and losses. When coupled with high-definition options, Agilent's platform enables identification of target regions with greater sensitivity and less noise than other tools. Our HD-CGH arrays enable you to identify, objectively, the critical regions for your research focus using CGH-specific 60-mer probes, significantly improving resolution.

Improve Signal-to-Noise Ratios

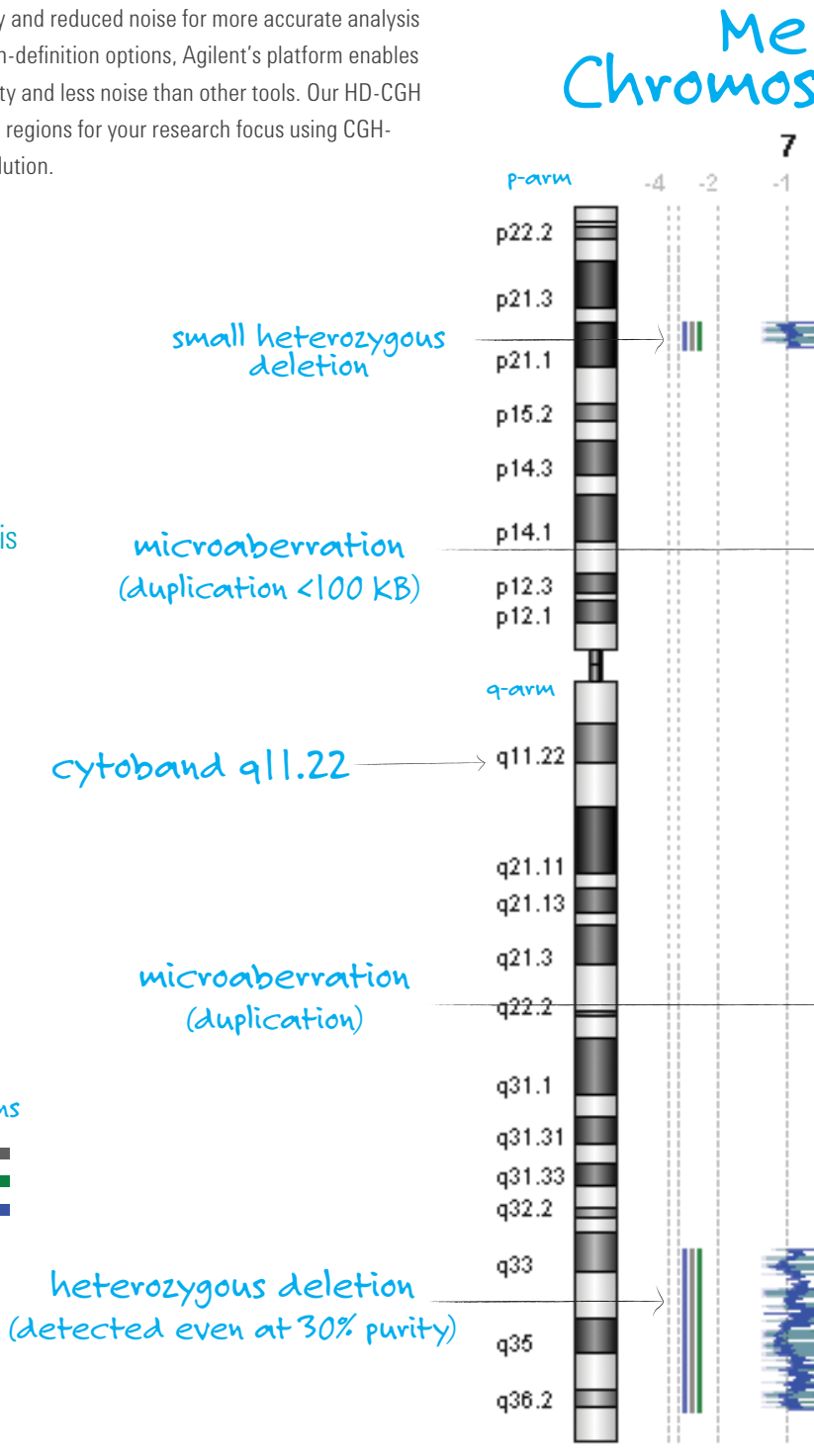
- Use CGH-specific parameters for background subtraction and other calculations.

Reliably Identify Single Copy Changes

- Characterize specific areas of interest with an overall median probe spacing of 8.9 kb, even in samples that are diluted or only 30% pure.

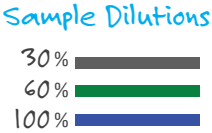
Look Closely For High-Definition Analysis

- Visualize data at multiple levels for in-depth analysis of target regions.



Experimental Conditions

M-MOCK cells derived from a leukemia patient were processed following standard Agilent aCGH protocols (Pub No. G4410-90010 v4.0) and analyzed using 1.5 µg of labeled DNA at 30%, 60%, and 100% purity. The plots for each degree of purity are based upon collective data from four separate microarrays (each dye-flip pair in opposite polarity, performed in duplicate).



ALL VARIATIONS? WOULD GLOBAL ANALYSIS OF COPY NUMBER CHANGES HELP MOVE YOUR RESEARCH IN THE R
ICATION SYNDROMES? CAN YOU DETECT SUBTELOMERIC REARRANGEMENTS IN IDIOPATHIC MENTAL RETARDATION?

Validate Your Results with CGH Analytics

Identify statistically significant variations. Remove the quandary of subjective analysis. Integrate data analysis seamlessly.

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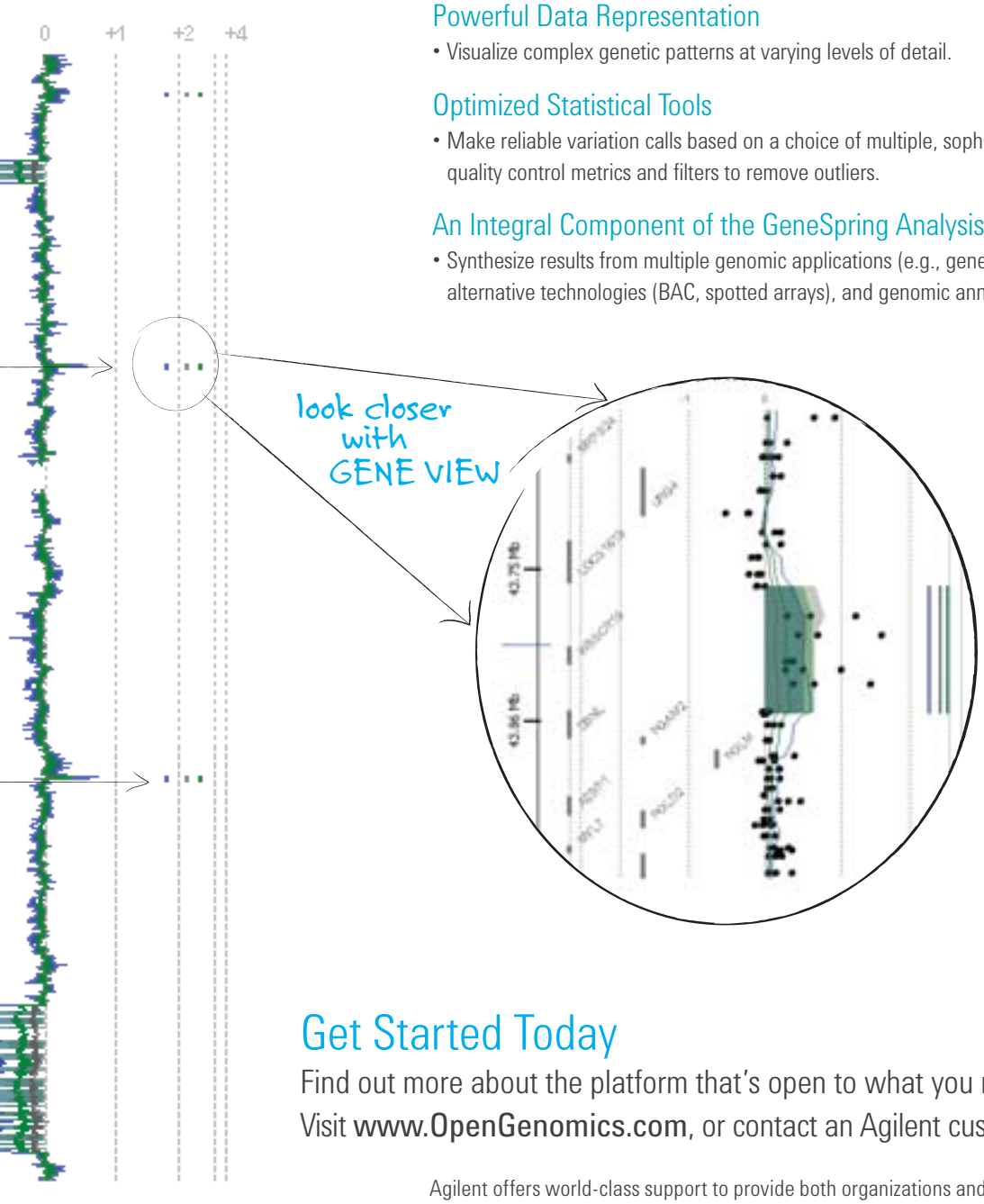

Agilent's CGH analytics software offers a sophisticated set of analytical tools for assessing chromosomal aberrations, helping you place results into biological context. Once you have identified key areas, analyze specific regions of interest for common gains and losses across cohorts.

Powerful Data Representation

- Visualize complex genetic patterns at varying levels of detail.

Optimized Statistical Tools

- Make reliable variation calls based on a choice of multiple, sophisticated algorithms. Harness robust quality control metrics and filters to remove outliers.

An Integral Component of the GeneSpring Analysis Platform

- Synthesize results from multiple genomic applications (e.g., gene expression, genotyping, or ChIP-on-chip), alternative technologies (BAC, spotted arrays), and genomic annotations.

Get Started Today

Find out more about the platform that's open to what you need.
Visit **www.OpenGenomics.com**, or contact an Agilent customer center at 1-800-227-9770.

Agilent offers world-class support to provide both organizations and individual scientists all of the technical solutions they need to successfully incorporate aCGH into their research. Agilent's DNA Microarray Platform offers technical solutions from beginning to end, providing everything you need to achieve success in your research.

IGHT DIRECTION? DO YOU NEED THE ABILITY TO WORK WITH WHOLE BLOOD, OR HIGHLY DILUTED SAMPLES?
WOULD YOU LIKE TO IDENTIFY MARKER AND DERIVATIVE CHROMOSOMES? TO CORRELATE DISTINCT DATA SETS?

Chart a Path into the Future of Genomics

Investigate the latest in peer science. Discover the potential of Agilent's oligo aCGH tools. Connect and learn more today.

As genomics moves towards a systems approach, novel techniques such as oligo aCGH will enable cytogeneticists and oncologists alike to examine familiar questions from fresh and innovative perspectives. New genomics applications are enabling scientists to define innovative approaches to challenging research problems. Agilent is committed to providing you with novel tools to define this path, and connecting you with others asking similar questions.

To hear from researchers who are charting their own course in Genomics visit www.OpenGenomics.com

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